Objective

Evaluate MERIS/MODIS/VEGETATION fAPAR products at 1km spatial resolution

- **MERIS**

  MGVI/fAPAR (Gobron, N., B. Pinty, et al. (2000). "Advanced vegetation indices optimized for up-coming sensors: design, performances and applications." IEEE Transactions on Geoscience and Remote Sensing **38**(6): 2489-2505.)

- **MODIS/fAPAR**

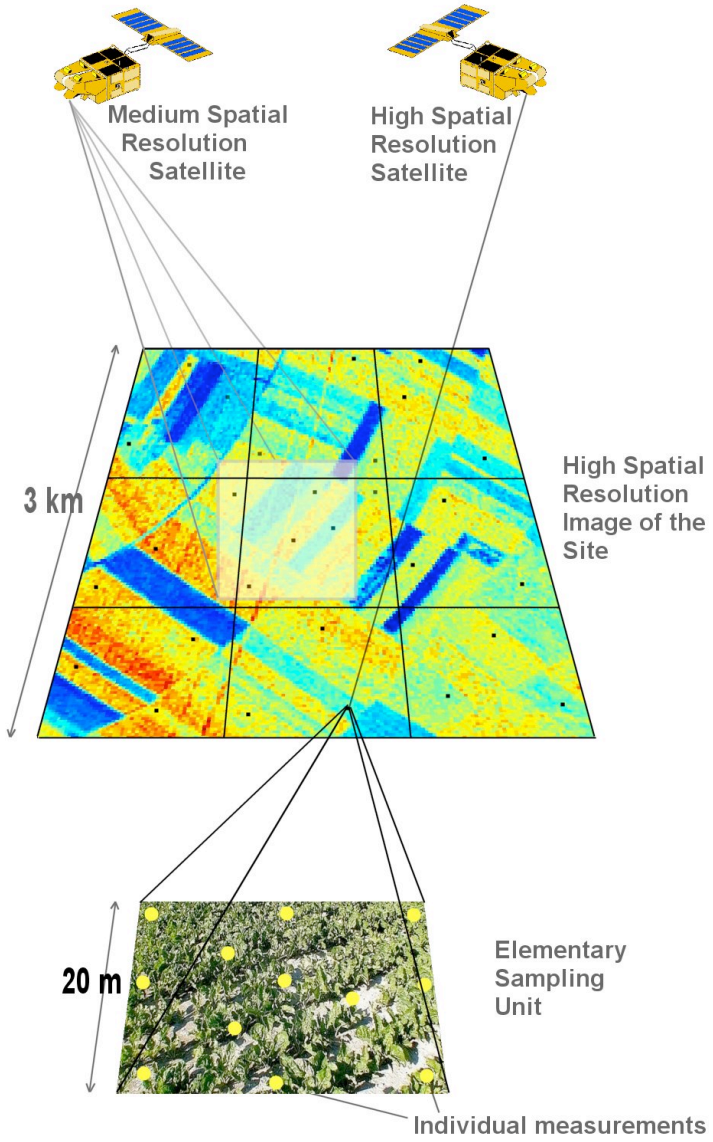
  ATBD-15 daily fAPAR (Knyazikhin, Y., J. V. Martonchik, et al. (1998). "Synergistic algorithm for estimating vegetation canopy leaf area index and fraction of absorbed photosynthetically active radiation from MODIS and MISR data." Journal of Geophysical Research **103**(D24): 32257-32275.

- **VEGETATION** (P products)

  fAPAR estimated from NDVI linear empirical relation established with SPOT high spatial resolution data.

Only level 2 products are validated (no temporal compositing)

Deriving medium spatial resolution fAPAR map from
- ground measurements of fAPAR
- and a high spatial resolution satellite image (SPOT)



Medium spatial resolution fAPAR map

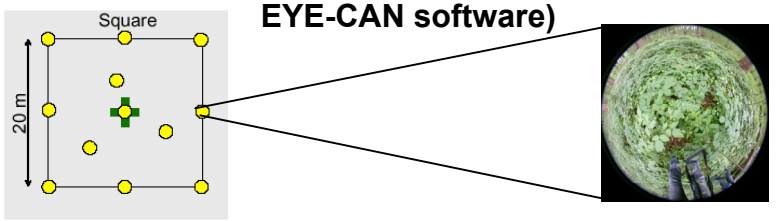
Agregation of high spatial resolution fAPAR map (image registration, convolution)

High spatial resolution fAPAR map

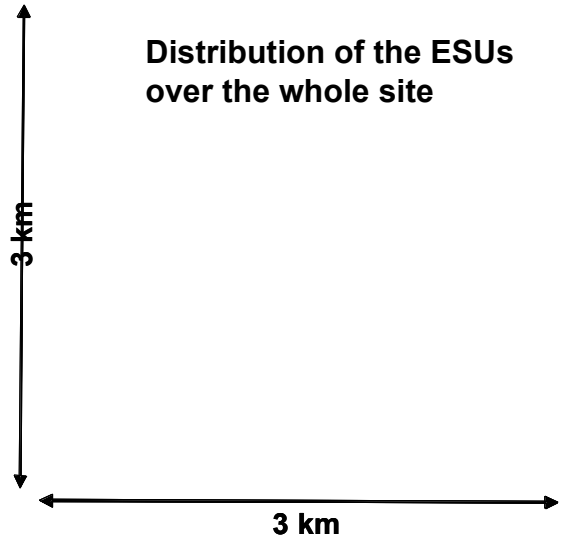
Spatial extension of ESU measurements (transfer function and cokriging)

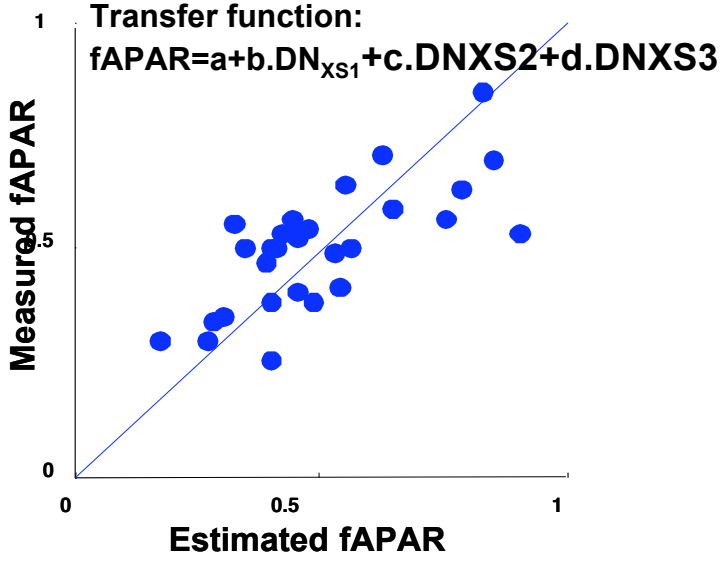
Local Ground measurements

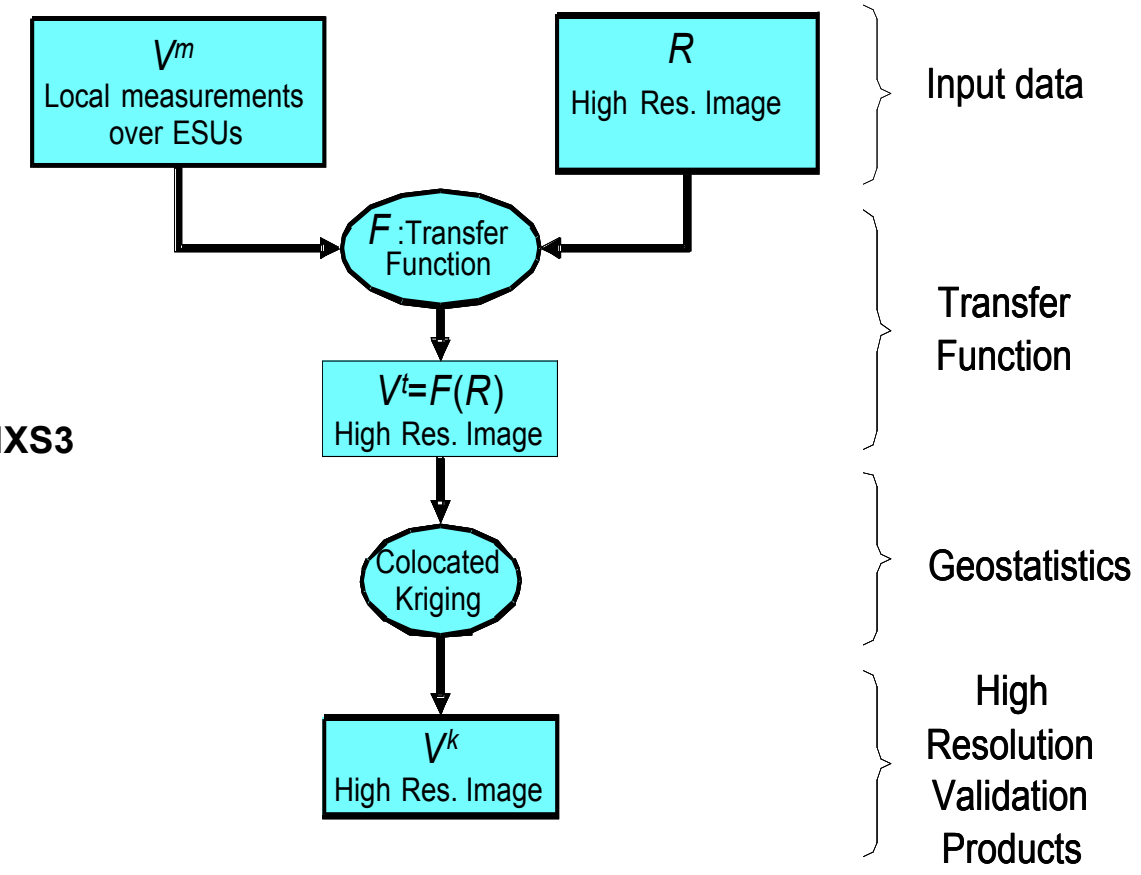
(12 hemispherical photographs processed using the EYE-CAN software)



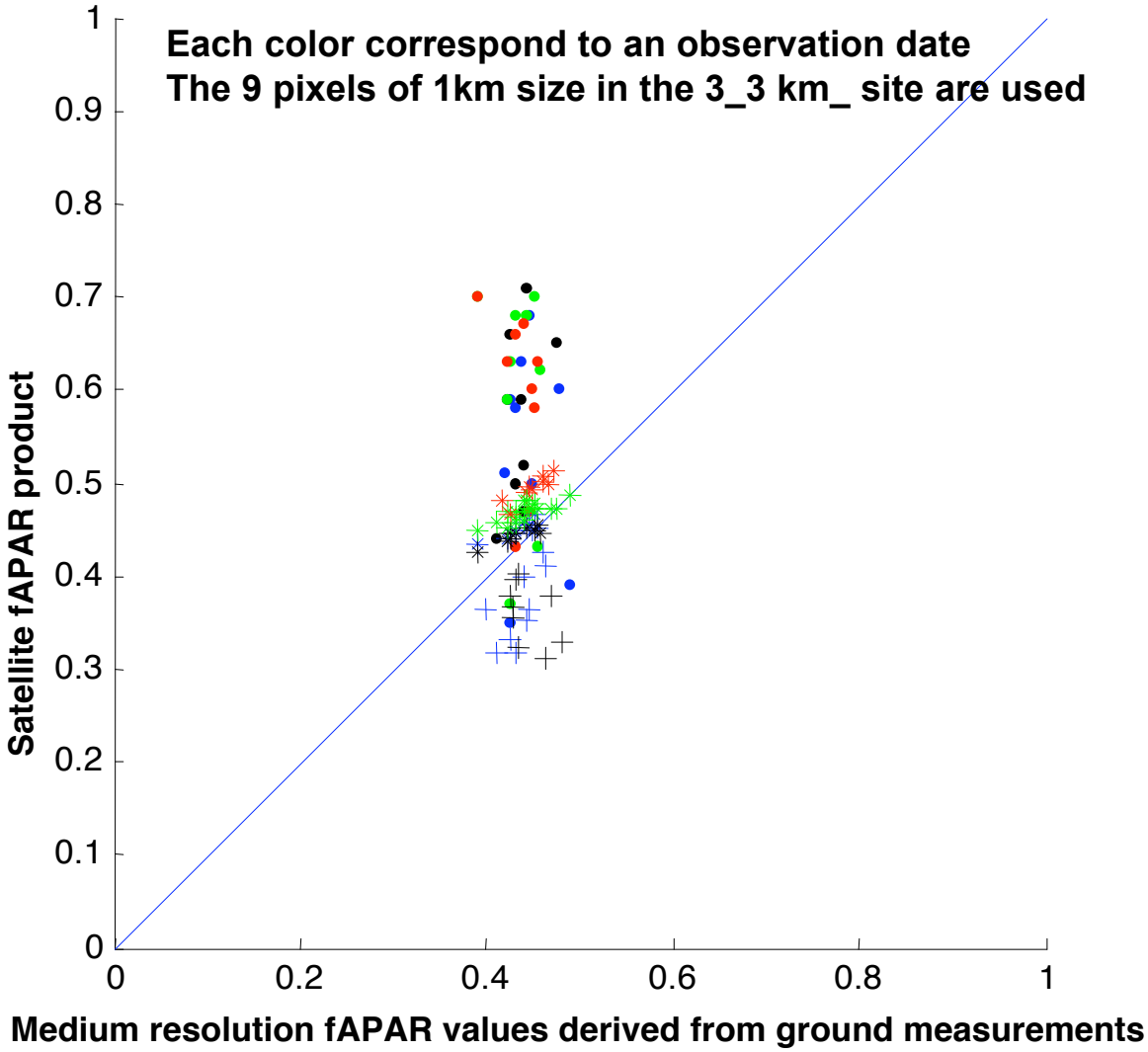
Generating the high spatial resolution fAPAR map







Validation: comparing fAPAR medium resolution map with satellite products



VEGETATION (+) **4 dates:**
using the transfer function developped over the ESUs:
« Validation of the validation»

MODIS (•) **4 dates:**
large range of variation
Apparently over-estimation

MERIS (+) **2 dates:**
Smaller range of variation
Apparently under-estimation

Conclusion

- **Lessons learned:**
  - **Distribution of the ESUs (good spatial dispersion, and good representativity of the several vegetation types within the whole site**
  - **ESUs should be representative of a high spatial resolution pixel (SPOT/ETM+): make enough replicates of individual measurements**
  - **ESUs should not be placed close to a border (because of absolute registration problems)**
  - **The transfer function should be preferentially empirical (independance with the validation of product algorithm, no atmospheric correction sensor calibration required, time delay between ground measurements and high spatial resolution sensor acquisition (SPOT, ETM+)**
  - **Geostatistical characteristics to be mainly derived from the high spatial resolution image (variogramme model, range)**
  - **Importance of registration problems!!**
  - **Importance of scaling problems (for LAI)**
- **References**
  - www.avignon.inra.fr/valeri
  - Baret, F., M. Weiss, et al. (2002). "VALERI: a network of sites and a methodology for the validation of medium spatial resolution satellite products." Remote Sensing of Environment **submitted**.
  - Weiss, M., L. De Beaufort, et al. (2001). Mapping leaf area index measurements at different scales for the validation of large swath satellite sensors: first results of the VALERI project. 8th International Symposium in Physical Measurements and Remote Sensing,, Aussois, France.